



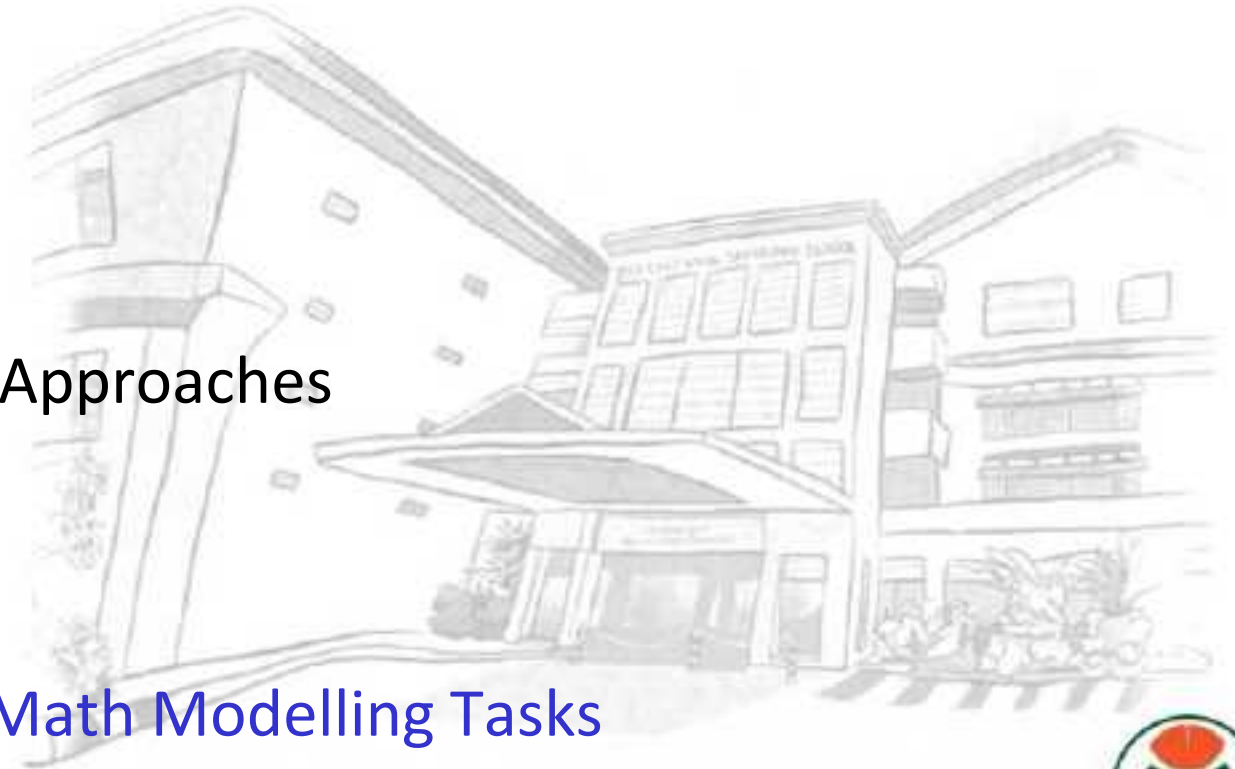
Yio Chu Kang Secondary School



***Mathematics Department
Programme and Subject Information***

Overview

1. Aims of O, N(A), N(T) Mathematics Syllabuses
2. Importance of Mathematics
2. Subject Based Banding
2. Our Department Vision & Mission
2. Our Department Teaching & Learning Approaches
2. Our Learning Experiences
 - ** Authentic Learning
 - ** Problems in Real World Context/Math Modelling Tasks
7. Our Assessment



Importance of Mathematics

Express	Normal (Academic)	Normal (Technical)
L1R5 \leq 20 (JC) L1R4 \leq 20 (MI)	EMB3 \leq 12 (PFP) (EL & MA \leq 3)	EMB
ELR2B2 \leq 26 (Polytechnic)	EMB3 \leq 19 (Sec 5/DPP)	

Minimum Entry Requirements & Aggregate Computation (ELR2B2)



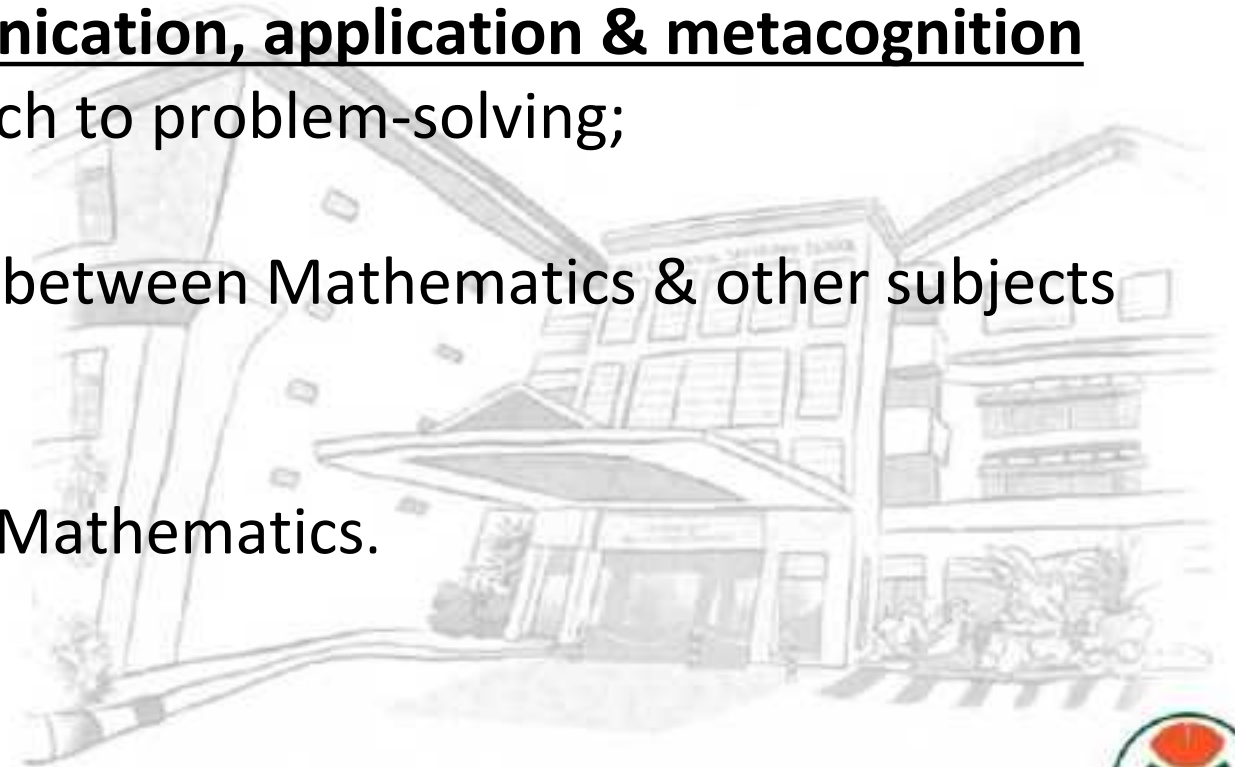
- English (EL)
 - C6 or better (Biz & Humanities-related)
 - D7 or better (Other courses)
- Relevant 2 (R2)
 - E or A Math
 - C6 or better (except Media & Design)
 - D7 or better (Media & Design)
 - Science / Humanities
 - C6 or better
- Best 2 (B2)
 - Best 2 other subjects

CCA points can be used to net off aggregate score



Aims of Secondary Mathematics Syllabuses

- **Acquire** mathematical **concepts & skills** for continuous learning in Mathematics and to support learning in other subjects;
- **Develop thinking, reasoning, communication, application & metacognition skills** through a Mathematical approach to problem-solving;
- **Connect ideas** within Mathematics & between Mathematics & other subjects through application of Mathematics;
- **Build confidence & foster interest** in Mathematics.



Syllabus Organization

- The concepts and skills covered in the syllabus are organised along 3 content strands.
- The development of processes, metacognition and attitudes are embedded in the learning experiences that are associated with the content.

Concept and Skills		
Number and Algebra	Geometry and Measurement	Statistics and Probability
Learning Experiences (Processes, Metacognition and Attitudes)		



Subject Based Banding

- Newly admitted Sec 1 students offered higher academic level subject

Higher Level Offered	Criteria
G3 Math	<ul style="list-style-type: none"> • Students taking G1 or G2 Math • AL 5 or better
G2 Math	<ul style="list-style-type: none"> • Students taking G1 Math • at least AL 6 in PSLE Mathematics or AL A in PSLE Foundation Mathematics

- MY/FOY/... (G 1)

Higher Level Offered	Criteria
G3 Math	<ul style="list-style-type: none"> • 75% or higher in the subject • 60% or higher in the overall average • Positive learning attitude to cope with the higher academic demand
G2 Math	



Our Department Mission

To provide an environment to nurture students to be independent learners and develop sound reasoning, critical thinking and collaborative problem-solving skills necessary for application in the real world.



Our Department Vision

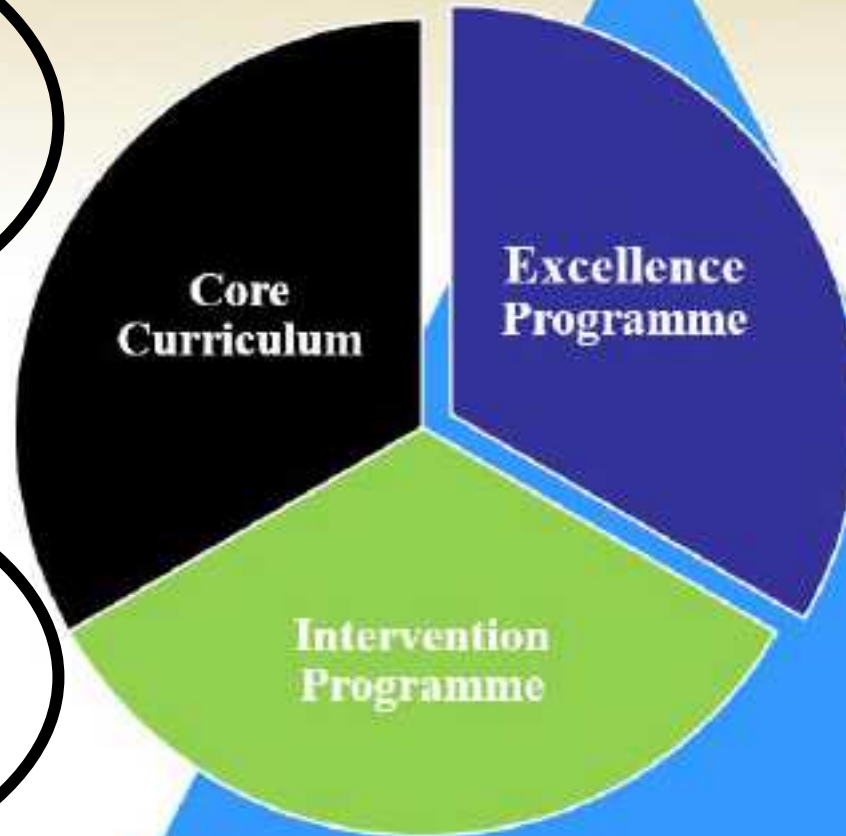
**Independent learners who are innovative
and effective problem solvers.**



Our Department Teaching & Learning Approaches

Developing passion and enhancing experiences in learning Mathematics

Independent learners

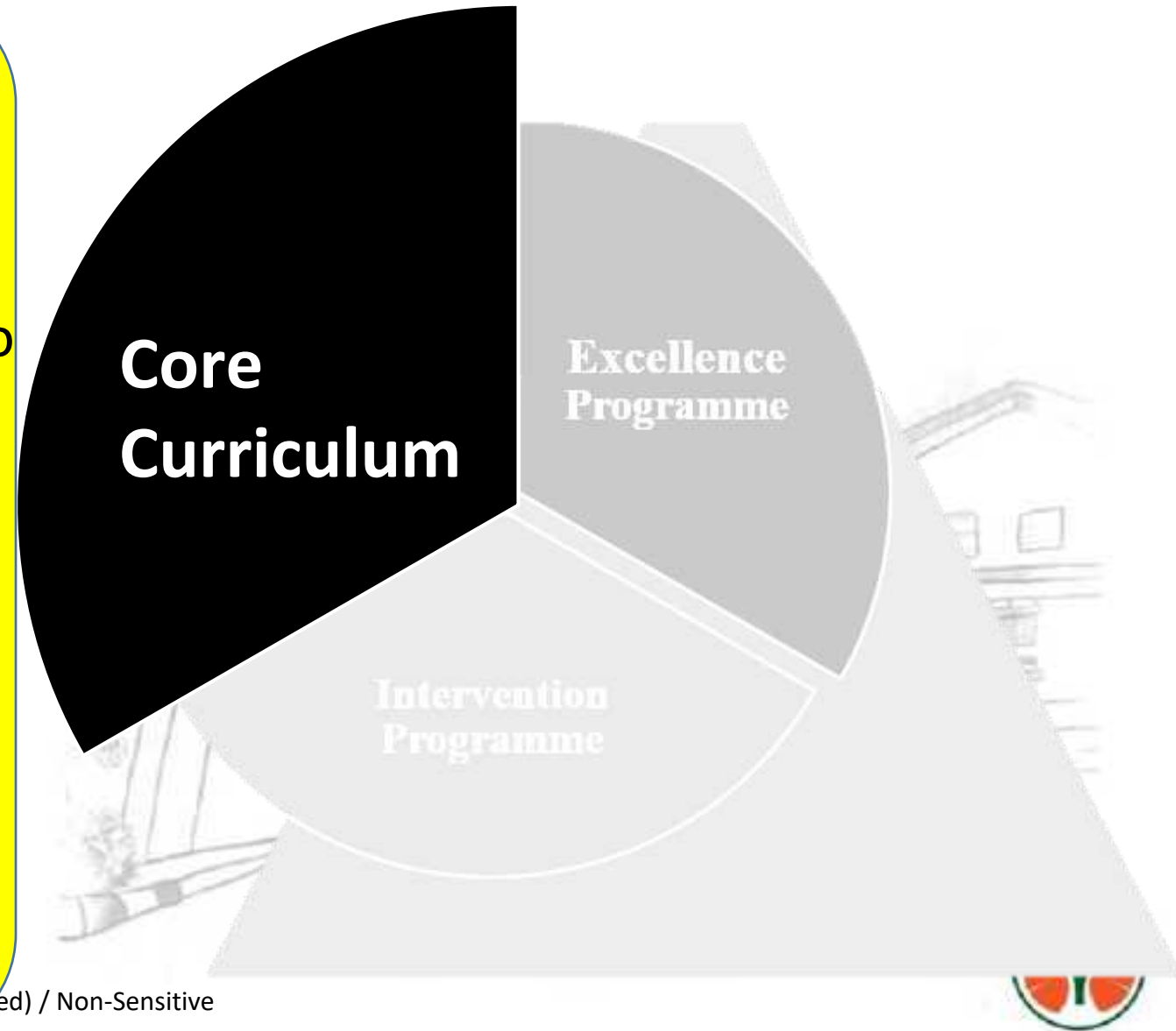


Innovative & Effective problem solvers



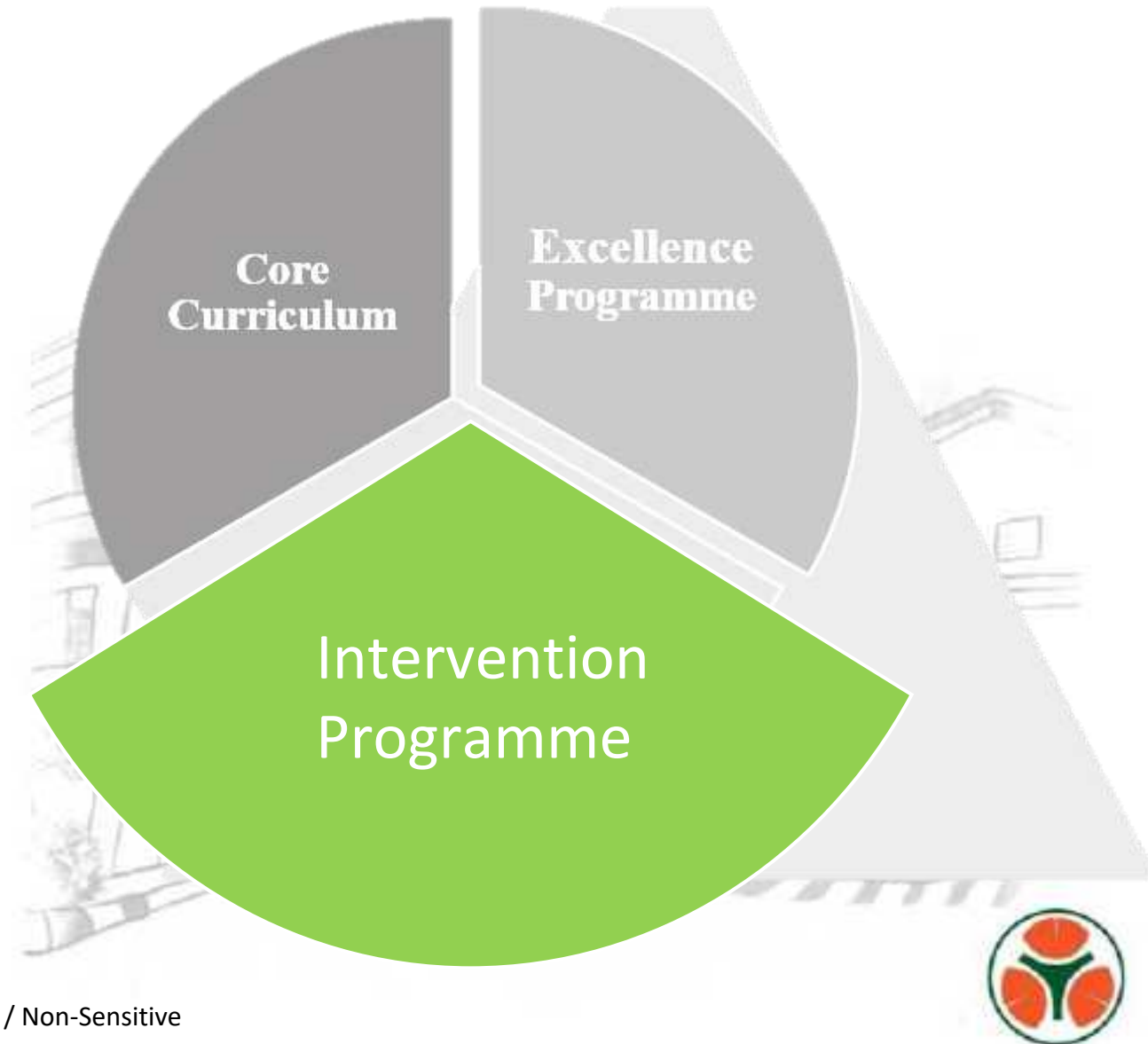
Our Department Teaching & Learning Approaches

- ✓ Baseline e-worksheets
- ✓ Differentiated approach to learning mathematics concepts
- ✓ Assessment *for* Learning tasks
- ✓ Create Learning Experience activities to improve students' process skills
- ✓ Incorporation of Problems in Real World Context tasks
- ✓ Incorporation of Math Modelling Tasks / Interdisciplinary Project Work
- ✓ Conduct Financial Literacy Programme
- ✓ Authentic Learning in Mathematics
- ✓ Inter-class AlgeGames competition
- ✓ Student Learning Space



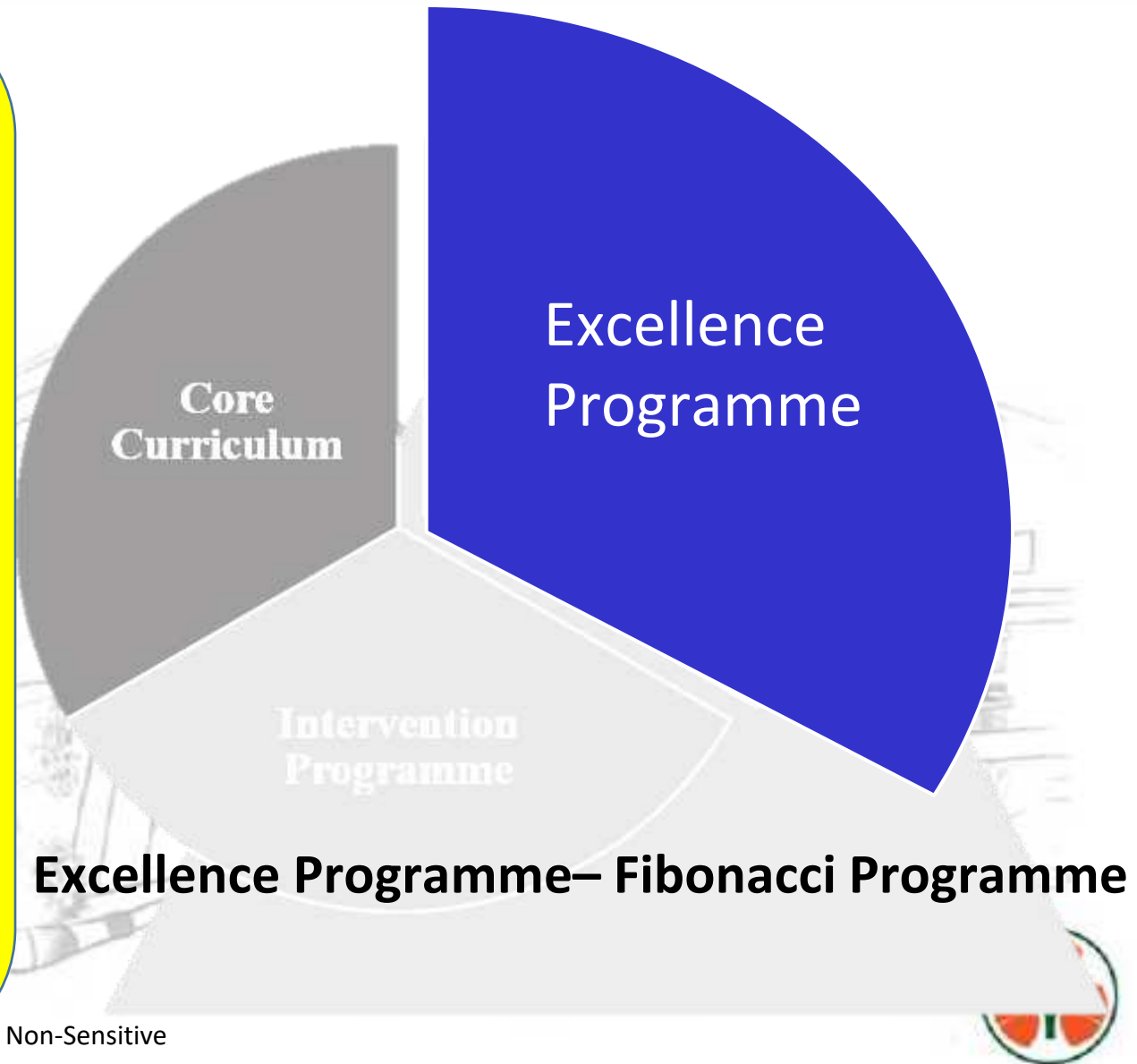
Our Department Teaching & Learning Approaches

- ✓ Structured Remedial Programme (Sec 4-5)
- ✓ Ad-hoc consultation (Sec 1-3)
- ✓ Math Clinic for graduating students (post prelim period)
- ✓ End-Of-Year Bridging Programme (Sec 3)
- ✓ Successful Transition for Academic Readiness (STAR) Programme (laterally transferred to a more demanding stream)
- ✓ Bridging Programme for SBB/FM students (Sec 1)



Our Department Teaching & Learning Approaches

- ✓ All Singapore Mathematics Competition (ASMC) for NA/NT students
- ✓ International Competitions and Assessments for Schools (ICAS)
- ✓ Singapore & Asian Schools Mathematics Olympiad (SASMO)
- ✓ Singapore Mathematics Kangaroo Competition (SMKC)
- ✓ Singapore Mathematics Olympiad (SMO)
- ✓ The Singapore NIE Mathematics Challenge for Secondary School (NMCSS) **NEW**



Fibonacci Programme

OUR ACHIEVEMENTS

ICAS

2022
Sec 1/2/3:
5 Distinctions
22 Credits
7 Merits

SASMOS

Sec 1/2/3:
8 Bronze
7 Honourable
Mention

ASMC

Individual Category:
Upper Secondary NA(Top 20)
Lower Secondary NA(Top 20)
Lower Secondary NT(Top 20)
Team Category:
Lower Secondary NA(1st
position)

SMKC

2 Silver
9 Bronze
3 Honourable
Mention

NIE Math Challenge 2023

2 Higher
Distinctions
5 Distinctions
25 Credits



Fibonacci Programme



PRIZE WINNERS (SASMOS)



Fibonacci Programme

PRIZE WINNERS (ICAS)



PRIZE WINNERS (SMO)



Learning Experiences @ YCKSS

National Cash Flow Competition



GIC Safehouse

ed)

Learning Experiences @ YCKSS

Financial Literacy Programme

This programme helps to create awareness of the importance of financial planning by providing them a head start in learning abstract concepts on financial literacy using experimental games and activities.



Learning Experiences @ YCKSS



Algebra Game Competition

Learning Experiences @ YCKSS



Algebra Game Competition

Learning Experiences @ YCKSS

Secondary 2 Math Modelling Task FITA--A Multi-Disciplinary ECO-STEM Project

Activity 2: Conclusion

(a) Review your prediction on whether the wind speed affects the temperature in your hypothesis. Using the graphs plotted in activity 1, answer the following questions

Does wind speed affect the temperature? Why?

[2]

(b) Does wind speed directly proportional to temperature? Explain.

[2]

(c) What time of the day when wind speed is at its peak?

(Answer: Wind speed is at its peak when the temperature is maximum and this is normally at noon)

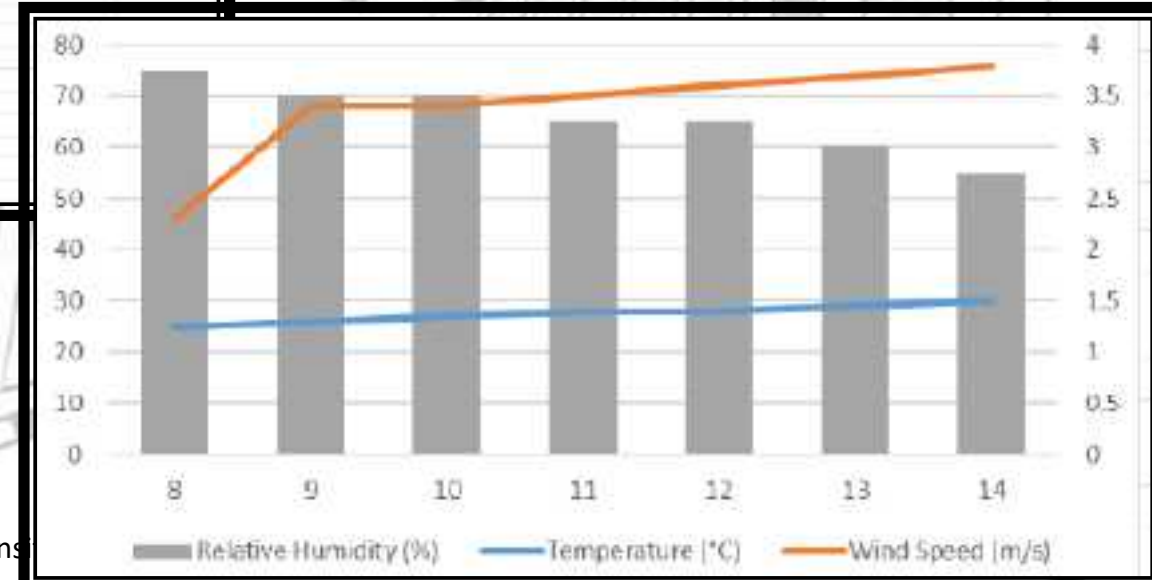
[1]



Lesson Objectives:

At the end of the lesson, students should be able to :

Draw inference from Statistical Diagrams using Averages and apply Statistical Diagrams in real-world context.



Learning Experiences @ YCKSS

Secondary 1 Math Modelling Task

SCENARIO: FUN FAIR (REAL-WORLD PROBLEM)

Your school is organising a fun fair to raise funds for the needy. Your class decides to make chocolate chip cookies using the following ingredients to sell at the fun fair.

List of Ingredients for Chocolate Cookies (for 48 cookies)

- 350 g all-purpose flour
- 1 teaspoon baking soda
- 130 g butter
- 300 g white sugar
- 1 egg
- 250 gram chocolate chips

Your group's task is to decide on the number of cookies your class should make and the selling price of the cookies in order to maximise your profits.

You should consider the following:

- Total cost of making the chocolate chip cookies (Justify the cost by getting screenshots/photos of actual prices and sizes of the items from your supermarket or other sources)
- Budget (no more than \$250)



Learning Experiences @ YCKSS

Programme Learning Outcomes

- Math reasoning and communication skills
- Data analysis and processing skills, not just book content
- An understanding of the relationships between
 - ✓ math problem solving
 - ✓ the real world
 - ✓ their intuitions
- An appreciation and interest in learning math
- Interpersonal skills
 - ✓ Collaboration
 - ✓ Mutual Respect



Learning Experiences @ YCKSS

8 Chloe saw the following recipe from an online website:

PERFECT CHOCOLATE CHIP COOKIES

and time 10 MINS | cook time 10 MINS | cool time 20 MINS
easier AS EASY AS APPLE PIE | same COOKIES
serves 24

INGREDIENTS

- 110 grams (3/4 cup) unsalted butter at room temperature
- 85 grams (3/4 cup + 1 tablespoon) granulated sugar
- 75 grams (3/4 cup) light brown sugar
- 1 large egg at room temperature
- 1/2 teaspoon vanilla extract
- 200 grams (3 3/4 cup minus 1 tablespoon) all purpose flour
- 1 1/4 teaspoon baking soda
- 1/4 teaspoon salt
- 90 grams (3/2 cups) semi-sweet chocolate chips



PRINT

★★★★★
5 from 3 votes

Example of Real-World Context Question in Sec 1 Express

Chloe is preparing 10 goodie bags of cookies to give to her friends for her birthday. Each goodie bag will contain 4 cookies.

- (a) Show that she needs to bake a minimum of 3 batches of cookies.

Answer

[1]

- (b) Chloe only has a block of 125 g unsalted butter. Given that a block of 125 g unsalted butter cost \$2.85, calculate how much more money she needs to buy enough butter to bake the cookies.

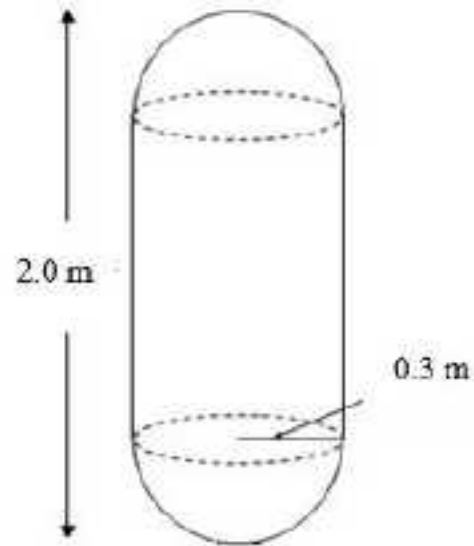
Answer \$

[2]

Learning Experiences @ YCKSS

- 9 The figure below shows a container that will be used to store liquid fuel. It is made up of a cylinder with two hemispherical base of radius 0.3 m.

The total length of the container is 2.0 m. The thickness of the metal may be neglected.



- (a) (i) Show that the total surface area of the outside of the tank is $\frac{6}{5}\pi \text{ m}^2$.
- (ii) Calculate the cost of painting the outside of the tank, correct to the nearest cent, given that it costs \$22.50 to paint one square metre.
- (b) Given the height of the liquid fuel in the tank is 1.2 m. Calculate the volume of the liquid fuel.

**Example of Real-World
Context Question in
Sec 2**



Learning Experiences @ YCKSS

10 The Airbus A380 is the world's largest passenger aircraft.



Source: IATA / www.icao.int

The A380 has two passenger decks and runs on four jet engines.

Here are the A380 aircraft characteristics data.

Dimensions	
Length	73 metres
Height	24.1 metres
Wheel Base	30.4 metres
Weights	
Maximum Take-off Weight	560 000 kg
Maximum Landing Weight	386 000 kg
Maximum Zero Fuel Weight	361 000 kg
Maximum Allowable Payload Weight*	91 000 kg
Engines	
Powerplants	A380-800 – Four 311kN (70,000lb), initially de-rated to 302kN (68,000lb), later growing to 374kN (84,000lb) thrust Rolls-Royce Trent 900 or 363kN (81,500lb) thrust Engine Alliance (General Electric-Pratt & Whitney) GP-7200 turbofans.
Performance	
Maximum Fuel Capacity	320 000 litres
Range with Maximum number of passengers on Full Tank	15 700 km

*Payload weight includes weight of passengers and other items put on aircraft that generate revenue for the airlines, eg, luggage, inflight meal, cargo etc.

(a) Given that the fuel density is 0.785 kg/litre, find the maximum weight, in kg, of the fuel in the aircraft in standard form, correct to 4 significant figures. [2]

(b) The stem-and-leaf diagram below shows the average weight of passengers from 20 flights travelling from Singapore to Paris.



Key: 8 | 2 means 82 kg

Calculate the mean of the average weight of passengers from the 20 flights. [2]

Example of Real-World Context Question in Upper Sec

A commercial airline modifies the seating configuration and plans to board 616 passengers into their A380 plane for a direct flight from Singapore to Paris. The direct flight from Singapore to Paris takes around 13.5 hours and two inflight meals will be served. The passengers consist of 26 passengers in first class cabin, 90 passengers in business class cabin and 500 passengers in economy class cabin. Each flight will require 4 pilots and 20 cabin crew. The commercial airline also loads their air mail packages and air cargo up to weight of 600 kg into the A380 aircraft as postal services.

Carry-On Luggage Allowance



Carry-On luggage allowance for Economy Class

- 1 bag per passenger

Carry-On luggage allowance for First/Business Class

- 2 bags per passenger

Maximum Weight of Carry-on Luggage bag: 7 kg per bag.

Checked-In Luggage Allowance



Maximum Weight for Economy Class: 40 kg per passenger.

Maximum Weight for Business Class: 50 kg per passenger.

Maximum Weight for First Class: 100 kg per passenger.

Flights are considered safe when the total payload is less than 90% of the maximum allowable payload specified for the aircraft. Determine whether this seating configuration is safe. Justify your decision with calculations. State at least one assumption you made in the calculation.

[5]

Learning Experiences @ YCKSS

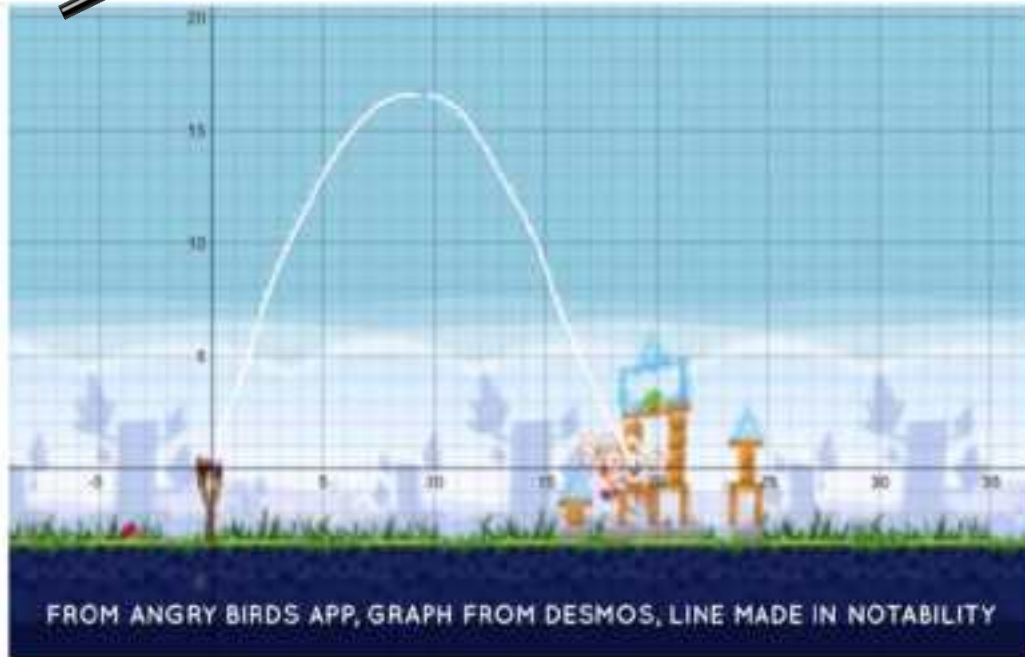
SLS Learning Package (Real World Applications of Math Concepts)

Trigger

Observe carefully the shape of the path of angry bird below:



Observe carefully the shape of the path of angry bird below:

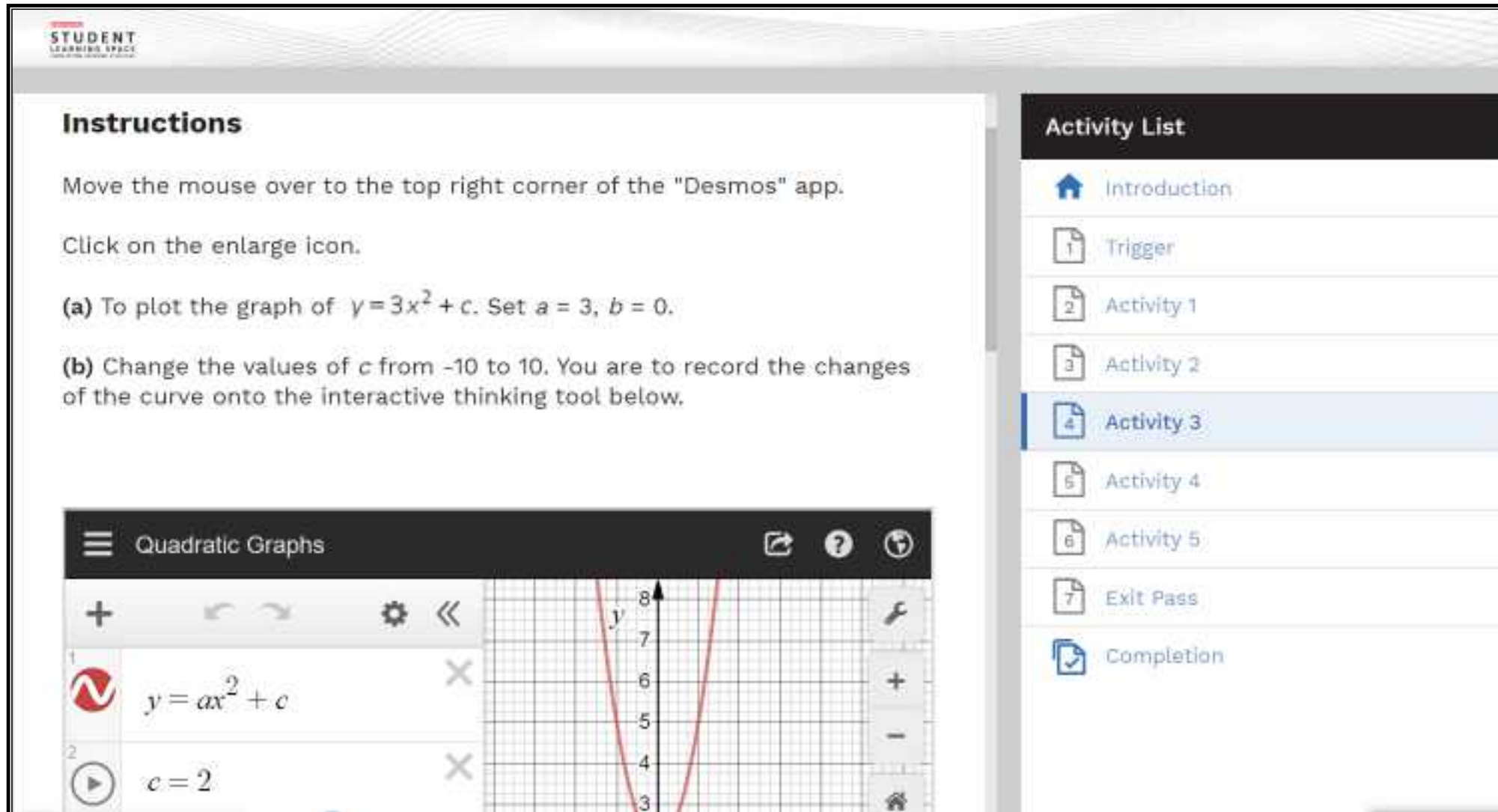


You are to search for real-world examples of structures/ scenarios with the curve you see above.



Learning Experiences @ YCKSS

SLS Learning Packages



STUDENT LEARNING SPACE

Instructions

Move the mouse over to the top right corner of the "Desmos" app.

Click on the enlarge icon.

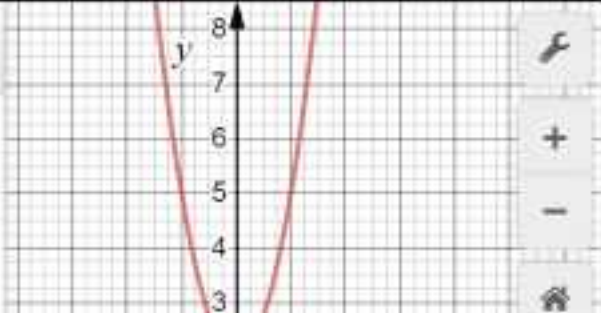
(a) To plot the graph of $y = 3x^2 + c$. Set $a = 3$, $b = 0$.

(b) Change the values of c from -10 to 10 . You are to record the changes of the curve onto the interactive thinking tool below.

Quadratic Graphs

$y = ax^2 + c$

$c = 2$



Activity List

- Introduction
- 1 Trigger
- 2 Activity 1
- 3 Activity 2
- 4 Activity 3**
- 5 Activity 4
- 6 Activity 5
- 7 Exit Pass
- Completion



Learning Experiences @ YCKSS

SLS Learning Package (Inquiry-Based Learning)

Measure of Spread of Data : Understanding Standard Deviation

Students attempt the trigger activity to understand the meaning of spread of data and its application.

WHO TO REPRESENT THE SCHOOL?

There are two students in Mrs Ng's class who are very good in Mathematics. Mrs Ng would like to select one of them to represent the school to participate in a Mathematics Competition. The test scores of the two students on three mathematics tests are as follows:

	Student A	Student B
Test Score 1	75	83
Test Score 2	84	85
Test Score 3	86	87
Mean Test	85	85
Standard Deviation	8.6	3.6

[Read Less](#)

Interactive Thinking Tool

Who to represent the school? [View All](#)

Which student should Mrs Ng choose? Explain your answer.

Investigative Activity: Measure of Spread using Standard Deviation

Objective:


With the use of [GeoGebra](#), students are to-

1. Observe and understand how the spread of data affects the standard deviation.
2. Compare means and standard deviations of different sets of data to see the relationship between data points, mean and standard deviation.

[Read Less](#)

Instructions to students:

Before we begin the activity, make sure that you have a copy of the activity worksheet 'Exploring Mean of Spread using Standard Deviation'. If you do not have a copy, you may download the worksheet below.

[Exploring_Mean_of_Spread_using_Standard_Deviation.docx](#) 

Open the following [GeoGebra applet](#) in a separate tab by clicking on this [link](https://www.geogebra.org/m/rjeuyq4k) (<https://www.geogebra.org/m/rjeuyq4k>)

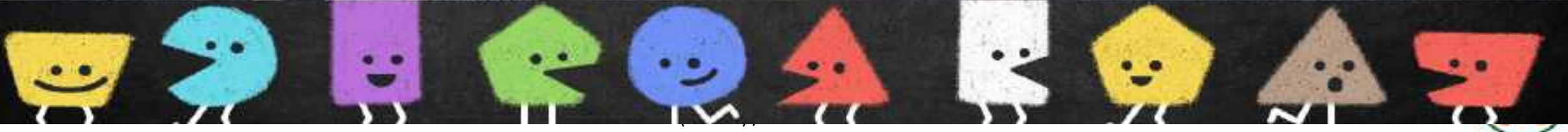
On the left hand side of the [GeoGebra applet](#), you will see 5 data points (A, B, C, D and E) represented by blue dots on a number line. The mean of the 5 data is represented by a red diamond on the number line. You can shift the data points by clicking on the blue dots with your mouse and dragging them to a new position on the number line.



Learning Experiences @ YCKSS



MARCH.14



Learning Experiences @YCKSS



A PIEM

Piem is a poem written in Pilish.



The rule of Pilish is simple. Each word's length must match the corresponding number in the sequence of digits of pi.

A piem written in Pilish
using the first 10 digits of Pi
(3.141592653) :

WOW(3), A(1) STAR(4)
A(1) FIERY(5)
SUPERNOVA(9)
IN(2) COSMIC(6)
BURST(5)
Wow(3) !



Learning Experiences @YCKSS

CHALLENGE

Now that you understand the simple rule of Pilish, we invite you to contribute your very own piem (a poem written in Pilish) and join a quiz.

SCAN ME !!!



WOW!
GREAT PRIZES
TO BE WON!





TIW10 YCKSS Pi Week



1



[7th Mar] Memory Monday

How many digits of Pi can you recall?

2



[8th Mar] Titbit Tuesday

Because everyone deserves a titbit from the math department!

3

W

[9th Mar] Wordle Wednesday

Heard of Wordle? Challenge yourself now!

4



[10th Mar] Tournament Thursday

Do you have what it takes to be the ultimate Pi Week Champ?

5



[11th Mar] Feedback Friday

We love to hear your thoughts :)

Attractive Prizes
to be won!





TIW10 YCKSS Pi Week
#throwback

MEMORY MONDAY





TIW10 YCKSS Pi Week
#throwback

TITBIT TUESDAY





TIW10 YCKSS Pi Week
#throwback

WORDLE WEDNESDAY

Level 1 – Ratio

Level 2 – Circle

Level 3 – Diameter

Custom Wordle



Make your own wordle



R A T I O



MATHLER



Find the hidden calculation that equals 48

New puzzle in 13:09:20

3 6 / 6 * 8

Custom Wordle



Make your own wordle



C I R C L E

Custom Wordle



Make your own wordle



D I A M E T E R





TIW10 YCKSS Pi Week
#throwback

WORDLE WEDNESDAY





**TIW10 YCKSS Pi Week
TODAY!**

TOURNAMENT THURSDAY



www.blooket.com

Assessment Format

Mathematics Lower Secondary (Express & Normal Academic)

Paper and Duration	Item Type and Number of Questions	Mark Allocation (Guide)	Marks (Weighting)
Paper 1 1 h 15 min	13-16 short-answer and structured questions	2 – 4 marks per question	50 (50 %)
Paper 2 1 h 15 min	7-9 structured and long-answer questions	4 – 8 marks per question	50 (50%)



Assessment Format

Mathematics Lower Secondary (Normal Technical)

Paper and Duration	Item Type and Number of Questions	Mark Allocation (Guide)	Marks (Weighting)
Paper 1 1 h 15 min	10 – 12 short questions largely free from context, testing more on fundamental concepts and skills. 1 longer question developed around a context.	2 – 4 marks per question 6 – 8 marks per question	40 (50 %)
Paper 2 1 h 15 min	10 – 12 short questions largely free from context, testing more on fundamental concepts and skills. 1 longer question developed around a context.	2 – 4 marks per question 6 – 8 marks per question	40 (50 %)

Assessment Format

Mathematics Upper Secondary (3/4 Express/5 Normal(Academic))

Paper and Duration	Item Type and Number of Questions	Mark Allocation (Guide)	Marks (Weighting)
Paper 1 2 h 15 min	There will be about 26 short answer questions. Candidates are required to answer all questions.	2 – 6 marks per question	90 (50 %)
Paper 2 2 h 15 min	There will be 9 to 10 questions of varying marks and lengths. The last question in this paper will focus specifically on applying mathematics to a real-world scenario. Candidates are required to answer all questions.	8 – 12 marks per question	90 (50%)



Assessment Format

Mathematics Upper Secondary (3/4 Normal Academic)

Paper and Duration	Item Type and Number of Questions	Mark Allocation (Guide)	Marks (Weighting)
Paper 1 2 h	There will be about 23 short answer questions. Candidates are required to answer all questions.	2 – 6 marks per question	70 (50 %)
Paper 2 2 h	<p>There will be 2 sections:</p> <p><u>Section A</u> Section A will contain 9 to 10 questions of varying lengths. The last question in this section will focus specifically on applying mathematics to a real-world scenario. Candidates are required to answer all questions.</p> <p><u>Section B</u> Section B will contain 2 questions of which candidates will be required to answer only one. * The questions in Section B will be based on the underlined content and there will be one question from the 'Geometry and Measurement' strand and one from the 'Statistics and Probability' strand. * Each question carries the same number of marks, that is, either 7 or 8 marks.</p>	<p>3 – 6 marks per question</p> <p>7 – 8 marks per question</p>	70 (50%)



Assessment Format

Mathematics Upper Secondary (Normal Technical)

Paper and Duration	Item Type and Number of Questions	Mark Allocation	Marks (Weighting)
Paper 1 1 h 30 min	<p>There will be 11–13 short questions carrying 2–4 marks, largely free from context, testing more on fundamental concepts and skills, followed by 2 longer questions carrying 6–8 marks, developed around a context.</p> <p>Candidates are required to answer all questions which will cover topics from the following strands</p> <ul style="list-style-type: none"> • Number and Algebra • Geometry and Measurement • Real-World Contexts related to Number and Algebra and Geometry and Measurement 	<p>2 – 4 marks per short question</p> <p>6 – 8 marks per long question</p>	50 (50%)
Paper 2 1 h 30 min	<p>There will be 11–13 short questions carrying 2–4 marks, largely free from context, testing more on fundamental concepts and skills, followed by 2 longer questions carrying 6–8 marks, developed around a context.</p> <p>Candidates are required to answer all questions which will cover topics from the following strands</p> <ul style="list-style-type: none"> • Number and Algebra • Statistics and Probability • Real-World Contexts related to Number and Algebra and Statistics and Probability and Statistics and Probability 	<p>2 – 4 marks per short question</p> <p>6 – 8 marks per long question</p>	50 (50%)

Assessment Format

Additional Mathematics (Express)

Paper and Duration	Item Type and Number of Questions	Mark Allocation (Guide)	Marks (Weighting)
Paper 1 2 h 15 min	There will be 12 – 14 questions of varying marks and lengths, up to 10 marks per question Candidates are required to answer ALL questions.	Up to 10 marks per question	90 (50%)
Paper 2 2 h 15 min	There will be 9 – 11 questions of varying marks and lengths, up to 12 marks per question Candidates are required to answer ALL questions.	Up to 12 marks per question	90 (50%)



Assessment Format

Additional Mathematics (Normal Academic)

Paper and Duration	Item Type and Number of Questions	Mark Allocation (Guide)	Marks (Weighting)
Paper 1 1 h 45 min	There will be 13 – 15 questions of varying marks and lengths. Candidates are required to answer ALL questions.	3 – 10 marks per question	70 (50 %)
Paper 2 1 h 45 min	There will be 8 – 10 questions of varying marks and lengths. Candidates are required to answer ALL questions.	3 – 12 marks per question	70 (50 %)



Assessment Format

Principles of Accounts

PAPER AND DURATION	ITEM TYPE AND NUMBER OF QUESTIONS	MARK ALLOCATION (GUIDE)	MARK ALLOCATION (WEIGHTINGS)
1 (1 HOUR)	Answer three to four compulsory structured questions.	8-12 MARKS PER QUESTION	40 (40%)
2 (2 HOURS)	<p>Answer four compulsory structured questions.</p> <ul style="list-style-type: none">• One question requires the preparation of financial statements for a business for one financial year.• A scenario-based question will be part of one of the three remaining questions.	<p>FINANCIAL STATEMENT QUESTION. (20 MARKS)</p> <p>SCENARIO BASED QUESTION. (7 MARKS)</p> <p>REMAINING 2 QUESTIONS. (15-20 MARKS PER QUESTION)</p>	60 (60%)

The scenario-based question requires students to make a decision between two possible choices in the context of a fictitious business. Each scenario will include both accounting and non-accounting information that students are expected to use to support their decision.



Subjects Offered (Upper Secondary)

Sec 3/4 Express	Criteria
Additional Mathematics	At least 65% -75% for Sec 2 Mathematics results
Principles of Accounts	NA

Sec 3/4/5 Normal (A)	Criteria
N Level Additional Mathematics	60%- 65% for Sec 2 Mathematics results
O Level Mathematics*	60%- 65% for Sec 2 Mathematics results
Principles of Accounts	NA

* Students taking N Level Additional Mathematics will also take O Level Mathematics



Thank You

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